

**ORIGINAL RESEARCH**

# Clinical Spectrum of Children with Dengue like Illness at a Tertiary Care Hospital

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**ABSTRACT**

**Background:** Dengue fever (DF) is a mosquito-borne viral illness in tropical region caused by the dengue virus, characterized by a wide range of clinical manifestations, from mild febrile illness to severe conditions such as dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS). **Aim and Objectives:** This study aimed to evaluate the clinical spectrum and laboratory profiles of children with dengue fever and dengue-like illness. **Methods:** A prospective observational study was conducted over a period of 18 months at a tertiary care hospital in central India, including 120 children aged 6 months to 18 years who presented with dengue-like illness. Clinical features, hematological parameters and serological status were documented and analyzed. **Results:** Out of 120 patients, 73 were males (60.8%) and 47 were females (39.2%). 26 (21.7%) were serologically confirmed by rapid diagnostic test (RDT) as dengue cases, while 94 (78.3%) were classified as dengue-like illness. Fever was the most common symptom in both groups, with retro-orbital pain, rash and ARDS more prevalent in dengue cases. Thrombocytopenia was observed in 91.2% of dengue cases, with severe thrombocytopenia in 19.2%. Leukopenia was noted in 69.2% of dengue cases. Mortality rates were 11.5% in dengue and 4.3% in dengue-like illness, primarily due to ARDS and DSS. **Conclusion:** The study highlights the diverse clinical spectrum of dengue fever and the similarities between serologically confirmed and unconfirmed cases, emphasizing the need for vigilant clinical management during dengue outbreaks. Despite the serological differences, standardized treatment protocols were effective, leading to similar clinical outcomes.

**Keywords:** Dengue fever, Dengue like illness, clinical spectrum

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**INTRODUCTION**

Dengue fever (DF) is a mosquito-borne (Aedes aegypti) arboviral disease caused by the dengue virus (DENV) and is characterized by biphasic fever, myalgia or arthralgia, rash, leukopenia, and lymphadenopathy. Dengue shock syndrome (DSS), a severe and often fatal form of the disease, is characterized by capillary permeability, hemostatic abnormalities, and in severe cases, a protein-losing shock syndrome with an immunopathological basis.[1,2]

Clinical features of dengue can vary widely, with both typical and atypical presentations.[3-5] Dengue is a major public health concern across tropical and subtropical regions globally. The World Health Organization (WHO) estimates that 50–100 million new dengue infections occur annually in more than 100 endemic countries. Approximately 1.8 billion people, or over 70% of the global population at risk for dengue, reside in the WHO South-East Asia

Region (SEAR) and Western Pacific Region, which together account for nearly 75% of the global dengue disease burden.[6,7]

Dengue virus was isolated in India during 1945 for the first time. The incidence of dengue has been found to be increasing from past few years. During 2018, a total of 1,24,493 cases were reported; 2,05,243 in 2019; 44,585 in 2020; 1,93,752 in 2021 and 2,33,251 in 2022. However, the case fatality rate (CFR- deaths per 100 cases) has declined from 3.3% in 1996 to 0.1% in 2019. The cases present every year during the period of July-Nov, indicating a seasonal pattern. However, the states in southern and western parts of the country report perennial transmission. [7]

Despite the widespread prevalence of dengue, there is a lack of detailed profiling of its clinical features, particularly in the pediatric population, where both typical and atypical presentations are not well documented.[8-10] Strengthening community awareness and vector control measures, especially

during the peri-monsoon period, is essential to reducing dengue cases.[4,5,7]

Early recognition and prompt treatment are critical to lowering dengue-related morbidity and mortality. This study aims to assess the clinical spectrum of dengue-like illness in children, focusing on the distribution of typical and atypical clinical features, to improve early identification and outcomes.

## MATERIAL AND METHODS

After approval from institutional ethical committee, the present prospective observational study was conducted in the Department of Paediatrics, Sri Aurobindo Medical College and Postgraduate Institute, Indore. 120 Children aged 6 months to 18 years who presented with dengue-like illness in the paediatric outpatient (OPD) and inpatient (IPD) departments and satisfied the inclusion criteria were thoroughly evaluated. A written informed consent was obtained from their parents/caregivers.

### Inclusion Criteria

- Children presenting with dengue like illness between age group of 6 months to 18 years in Pediatric OPD and IPD
- Parents/Caregivers who consented for participation in the study

### Exclusion Criteria

- Parents/Caregivers not consenting for participation in the study

### Methodology

According to specific inclusion criteria, 120 clinically suspected patients with fever (presenting within 5-7 days of onset and having a body temperature above 100°F at the time of blood sample collection) and meeting the recent WHO case definition criteria for dengue fever (DF) and dengue hemorrhagic fever (DHF) were included in the study.

Clinical and demographic data were collected through interviews with the patients or their attendants, along with thorough physical examinations conducted by their treating physicians according to the pre designed proforma.

Reports from hematological investigations, dengue serology and data obtained from daily follow-ups

were analyzed. Hospitalized patients were categorized into Dengue Fever, Dengue Hemorrhagic Fever and Dengue Shock Syndrome according to the World Health Organization (WHO) severity grading scale.

Blood indices were initially measured on a continuous scale and then categorized based on clinically meaningful cut-offs. Thrombocytopenia was defined as a platelet count of less than 100,000 cells/mm<sup>3</sup>, while a hematocrit increase of more than 20% was considered raised. Leukopenia was defined as a white cell count of less than 4,000 cells/mm<sup>3</sup>.

Rapid Diagnostic Test (RDT) was used to detect NS1 antigen, IgM and/or IgG antibodies for dengue in the cases. MAC ELISA could not be done due to financial constraints of the caregivers of patients. [7]

All patients were treated according to standard protocols and outcomes were evaluated.

### Statistical Analysis

Raw data were collected, entered into Microsoft Excel 10.0, and analyzed using SPSS software version 22.0. For variables with a normal distribution, the data were presented as Mean  $\pm$  SD, while for non-normally distributed variables, the data were expressed as the median with an interquartile range. Categorical variables were represented as percentages or proportions. Descriptive statistics, such as percentages, were used to summarize the data's characteristics. Various statistical tests, including the Z test for proportions and the chi-square test for dichotomous variables, were employed to assess associations. A p-value of less than 0.05 was considered statistically significant.

## RESULTS

Clinicodemographic Profile of patients: Of the 120 patients included in the study, 73 were males (60.8%) and 47 were females (39.2%). The age distribution is shown in Table 1. Their ages ranged from 1 to 16 years, with a mean age of 9.5  $\pm$  3.4 years. Seventy-two patients (60%) were from rural areas, while 48 (40%) were from urban regions.

Out of the 120 clinically suspected dengue patients, 26 (21.7%) were found to have positive serology (IgM or IgM and IgG) to dengue virus by RDT (Dengue fever), and 94 (78.3%) were negative for dengue IgM antibodies (Dengue-like illness).

**Table 1. Demographic features of the study subjects**

Features	Dengue (N=26)	Dengue like illness (N=94)	Total	P value
<b>Area of living</b>				
Rural	15 (57.7)	57 (60.6)	72 (60%)	0.52 NS
Urban	11 (42.3)	37 (39.4)	48 (40%)	0.54 NS
<b>Sex</b>				
Male	14 (53.8)	59 (62.7)	73 (60.8%)	0.05 NS
Female	12 (46.2)	35 (37.2)	47 (39.2%)	0.05 NS
<b>Age</b>				
<5 Yrs	9 (34.6)	35 (37.2)	44	0.22 NS
6-10 Yrs	13 (50)	33 (35.1)	50	<b>0.03 S</b>
11-15 Yrs	3 (11.5)	14 (14.8)	17	0.58 NS

>15 Yrs	1 (3.8)	8 (8.5)	9	0.14 NS
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Among the 26 serologically positive dengue cases, 12 (46.2%) were classified as Dengue Fever (DF), 8 (30.8%) as Dengue Hemorrhagic Fever (DHF), and 6 (23.1%) as Dengue Shock Syndrome (DSS).

Similarly, among those with Dengue-like illness, 53 (56.4%) were classified as DF, 27 (28.7%) as DHF, and 14 (14.9%) as DSS according to the WHO classification. The involvement of all age groups was noted, with a predominance in the 6-10 years age group in both categories.

**Clinical features in dengue fever:** Clinical features in dengue fever are summarized in Table 2. Fever was the most prevalent clinical presentation, observed in all patients. The fever did not follow a specific pattern, with temperatures ranging from 38°C to 40°C. Other common symptoms included retro-orbital pain found in 16 (61.5%), flushing in 17 (65.3%) and

rash in 19 (73.1%) cases. Acute Respiratory Distress Syndrome (ARDS) was present in 7 (26.9%) of patients, while splenomegaly and ascites were each seen in 6 (23.1%) patients each. Encephalopathy was noted in 2 (7.7%) of the cases.

**Clinical features in dengue like illness:** Various clinical features in dengue-like fever are summarized in Table 2. The most common presenting features were fever, found in 81 (86.2%), flushing in 69 (73.4%) and rashes in 44 (46.8%) patients. Retro-orbital pain was observed in 31 (32.9%) cases. Additionally, Acute Respiratory Distress Syndrome (ARDS) was present in 8 (8.5%) patients and hepatomegaly was present in 88 (93.6%), splenomegaly in 56 (59.5%) and encephalopathy in 4 (4.3%) cases. Malena was seen in 6 (6.4%) cases.

**Table 2. Clinical features of patients with dengue fever and dengue like illness**

Clinical Features	Dengue Fever (n-26)	Dengue like illness(n-94)	p** Value, Sig
Fever	25 (96.1) *	93 (98.9)	0.45 NS
Retro orbital pain	16 (61.5)	46 (48.9)	0.02 NS
Flushing	17 (65.4)	68 (72.3)	0.14 NS
Rash	19 (73.1)	59 (62.7)	0.01*
ARDS	7 (26.9)	8 (8.5)	<0.001 HS
Encephalopathy	2 (7.7)	4 (4.3)	0.54 NS
Hepatitis	3 (11.5)	5 (5.3)	0.05 NS
Malena	2 (7.7)	3 (3.2)	0.08 NS
Epistaxis	1 (3.8)	2 (2.1)	0.67 NS
Haematemesis	1 (3.8)	1 (1.1)	0.51 NS
Hepatomegaly	17 (65.4)	28 (29.7)	<0.001 HS
Splenomegaly	6 (23.1)	10 (10.6)	<b>0.004 S</b>
Ascites	6 (23.1)	5 (5.3)	<0.001 HS
Pleural effusion	3 (11.5)	4 (4.3)	0.08 NS
Cyanosis	1 (3.8)	00	0.22 NS
Convulsion	1 (3.8)	2 (2.1)	0.47 NS
Oliguria	1 (3.8)	1 (1.1)	0.12 NS
Hypoglycemia	1 (3.8)	00	0.0465
Abscess	1 (3.8)	1 (1.1)	0.52 NS
Pneumoniae	1 (3.8)	1 (1.1)	1.0 NS
Hematuria	1 (3.8)	1 (1.1)	0.58 NS
Gum bleeding	00	1 (1.1)	1.0 NS
Sub conjunctival haemorrhage	00	1 (1.1)	0.35 NS
Dengue fever	12 (46.2)	53 (56.4)	<b>0.03 S</b>
Dengue hemorrhagic fever	8 (30.8)	27 (28.7)	0.72 NS
Dengue shock syndrome	6 (23.1)	14 (14.9)	<b>0.03 S</b>

**Laboratory profile in dengue fever:** The most common haematological abnormalities were thrombocytopenia and leukopenia. Platelet count below 20,000 / mm<sup>3</sup> was seen in 5 (19.2%) patients (Table 3). 18 (69.2%) had total white cell count below 4000 / mm<sup>3</sup>. Hematocrit value of > 20% for age and sex was noticed in 10 (38.5%) cases. Liver enzymes SGOT and SGPT were raised above the normal limit in 2 (11.5%) cases and 5 (19.2%) cases respectively.

**Laboratory profile in dengue like illness:** The

haematological profiles are given in Table 3. Platelet count was below 100,000 / mm<sup>3</sup> in 76 (80.8%) cases. In 13 (13.8%) patients, platelet count below 20,000/mm<sup>3</sup> was observed. Total white cell count below 4000 / mm<sup>3</sup> was seen in 58 (61.7%) patients. Hematocrit value of > 20% for age and sex was noticed in 31 (33.8%) cases in dengue like illness during admission. Liver enzymes SGOT and SGPT were raised above the normal limit in 6 (6.4%) cases and 7 (7.4%) cases respectively.

Platelet and leucocytic count	Dengue (N=26)	Dengue like illness (N=94)	P values
<b>Platelet range</b>			
< 10,000	01 (3.2)	2 (2.1)	<b>0.001 HS</b>
10,000-19999	5 (19.2)	13 (13.8)	
20,000-39,999	12 (46.2)	26 (27.7)	
40,000-59,999	4 (15.4)	18 (19.2)	
60,000-79,999	1 (3.8)	11 (11.7)	
80,000-99,999	1 (3.8)	6 (6.4)	
> 1,00,000	2 (7.7)	18 (19.2)	
<b>Leucocytic count</b>			
<4,000	18 (69.2)	58 (61.7)	0.13 NS
>4000	8 (30.8)	36 (38.3)	

**Table 3. Platelet and Leukocyte count during the admission among the patients with dengue fever and dengue like illness**

**Mortality:** Out of 26 dengue fever cases, 3 patients (11.5%) died, while 4 out of 94 patients (4.3%) with dengue-like illness succumbed to the illness. Among these patients, the most common clinical feature observed was acute respiratory distress syndrome (ARDS), present in 2 (66.7%) of the dengue fever cases and in 3 (75%) of the dengue-like illness cases ( $P < 0.001$ ; highly significant). Encephalopathy was observed in 1 (33.3%) patient with dengue fever and in 1 (25%) patient with dengue-like illness among the cases who died. Dengue Shock Syndrome (DSS) was noted in 2 (66.7%) of the dengue fever cases and in 1 (33.3%) of the dengue-like illness cases.

## DISCUSSION

The dengue virus is responsible for a wide range of illnesses, from mild undifferentiated fever to more severe forms such as classical dengue fever, dengue hemorrhagic fever and dengue shock syndrome. Dengue remains a significant public health issue in developing countries, including India. Over the past few years, a variety of clinical manifestations of dengue that differ from earlier reports from various parts of the country have been observed. [1-4]

In our study, the majority of the patients (60.8%) were male and from rural areas (60%). The most commonly affected age group was young children, aged between 7 and 10 years. Out of 120 patients admitted with suspected dengue fever, 26 (21.6%) were confirmed to have the disease through the detection of NS1 antigen or/and IgM (primary dengue) or both IgM and IgG antibodies (secondary dengue) against dengue. [7-10]

In many developing countries, epidemics of febrile illnesses can often be mistaken for dengue fever. [12] A recent review of published studies found it challenging to identify specific signs and symptoms that can reliably distinguish dengue from other febrile illnesses. [12-14]

In the current study, there was no significant difference in the clinical features between dengue fever and dengue-like illness. Typically, dengue fever is characterized as a short febrile illness, with the WHO criteria suggesting a duration of 2–7 days. [6, 7, 10] However, in this study, we observed a longer duration of fever compared to previous years, with the

mean fever duration in survivors being nearly 8 days. In some cases, the fever persisted for more than 4 weeks (6 patients).

The predominant clinical features included fever, retro-orbital pain, flushing, and myalgia, with vomiting being the most frequently observed symptom—consistent with findings from other studies.

However, a notable difference from earlier reports was the frequent occurrence of acute respiratory distress syndrome (ARDS), splenomegaly, prolonged fever, and encephalopathy. Specifically, 26.9% of dengue fever cases developed ARDS, compared to 8.5% of those with dengue-like illness.

Although hepatomegaly is included in the WHO clinical criteria for dengue fever (DF), splenomegaly is generally not considered a common feature of dengue infection. Previous studies in India have not reported a high frequency of splenomegaly in dengue cases. However, in our study, we observed splenomegaly in 23.1% of the dengue fever cases. Peripheral smears for malaria and serology for typhoid were negative in all cases, ruling out these other potential causes of splenomegaly. [6, 7]

Despite the high incidence of encephalopathy reported in several studies, our study observed encephalopathy in 7.7% of dengue fever cases and 4.3% of dengue-like illness cases.

In the analysis of laboratory findings, it was observed that platelet counts were below  $100,000/\text{mm}^3$  in 91.9% of dengue fever cases and 80.5% of dengue-like illness cases. Among them, 19.2% of dengue fever patients and 13.8% of those with dengue-like illness had platelet counts below  $20,000/\text{mm}^3$ . Thrombocytopenia is thought to result from bone marrow suppression during the acute phase of dengue virus infection. Other possible explanations include direct infection of megakaryocytes by the virus, leading to increased platelet destruction, or the presence of antibodies directed against the platelets. [2]

Additionally, leukocyte counts were less than  $4,000/\text{mm}^3$  in 69.2% of dengue fever cases and 61.7% of dengue-like illness cases. Coagulopathy was also frequently observed in patients with Dengue Shock Syndrome (DSS). In our study, prolongation of partial

thromboplastin time (PTT) was common in DSS cases of both groups. Another significant abnormality was elevated liver enzymes, with SGOT and SGPT levels raised above normal in 14 and 25 cases, respectively, among the dengue fever group, and in 26 and 32 cases, respectively, in the dengue-like illness group.

The mortality rate among dengue fever cases was 11.5% compared to 4.3% in dengue-like illness cases. The most common clinical features among these patients were acute respiratory distress syndrome (ARDS) in 66.7% and encephalopathy in 33.3% of dengue fever cases, compared to 75% and 25%, respectively, in dengue-like illness cases. Encephalopathy in dengue was traditionally believed to result from cerebral edema, hyponatremia, hypoperfusion, or intracranial bleeding. However, few studies have recognized the possibility of actual dengue viral invasion of the brain. [4]

The current study revealed no significant statistical differences in the spectrum of clinical presentation, hematological, and biochemical profiles between dengue fever and dengue-like illness. This suggests that during an epidemic, even in the absence of seroconversion, clinicians should suspect, evaluate, and anticipate dengue fever in patients who do not present with the standard clinical features. The outcomes, as shown in this study, did not differ significantly when both dengue fever and dengue-like illness were treated according to the standard protocol.

## CONCLUSION

The present study highlights the broad spectrum of clinical manifestations associated with dengue fever, ranging from mild febrile illness to severe complications such as dengue hemorrhagic fever and dengue shock syndrome. Despite the differences in serological confirmation, the clinical features, hematological and biochemical profiles between dengue fever and dengue-like illness showed no significant statistical variance. This underscores the importance of clinical vigilance during dengue epidemics, as cases without typical serological markers may still present with similar clinical symptoms and require prompt diagnosis and treatment. The study reaffirms that standardized treatment protocols are effective across both serologically confirmed and unconfirmed dengue cases, leading to comparable outcomes.

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